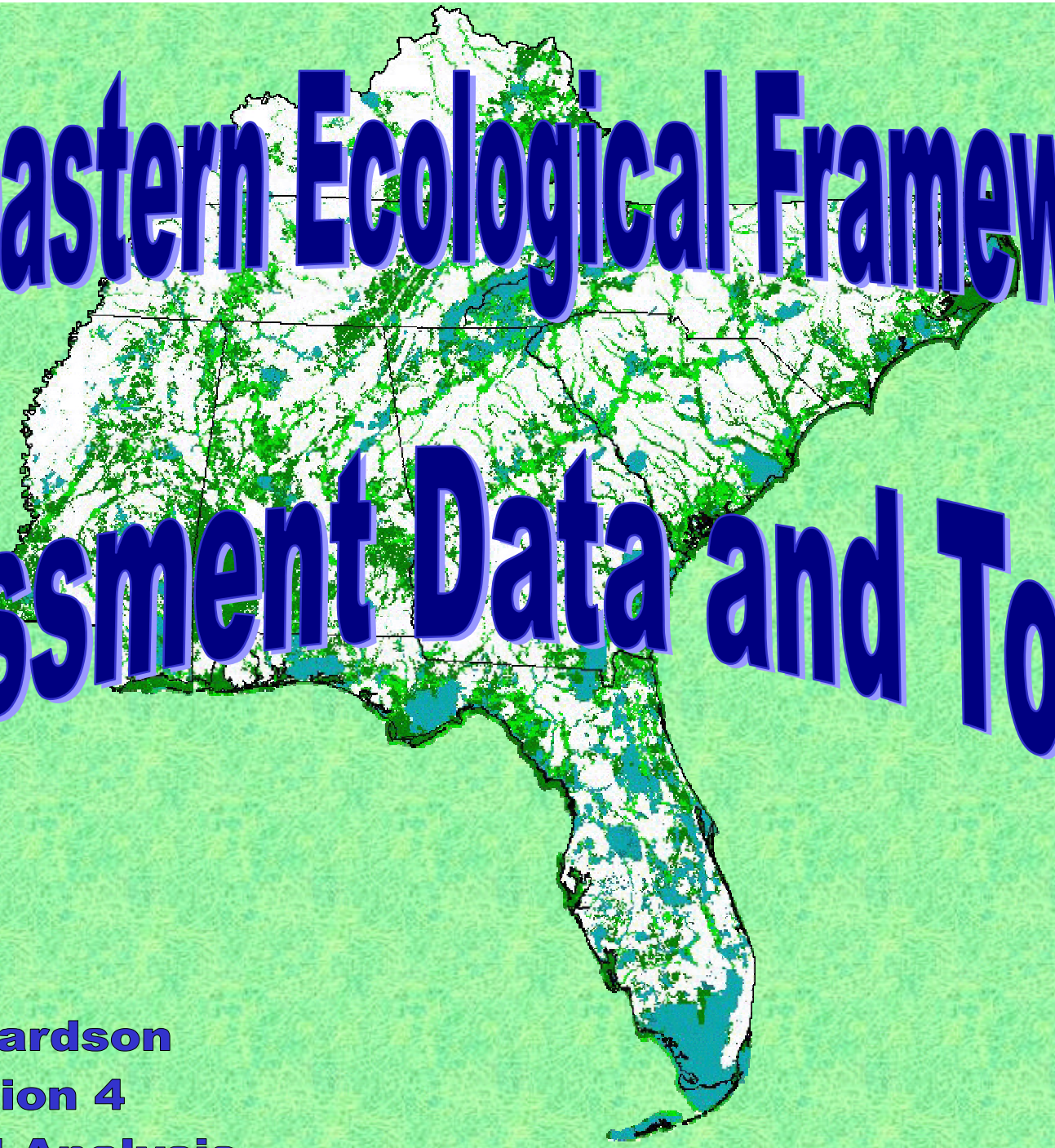
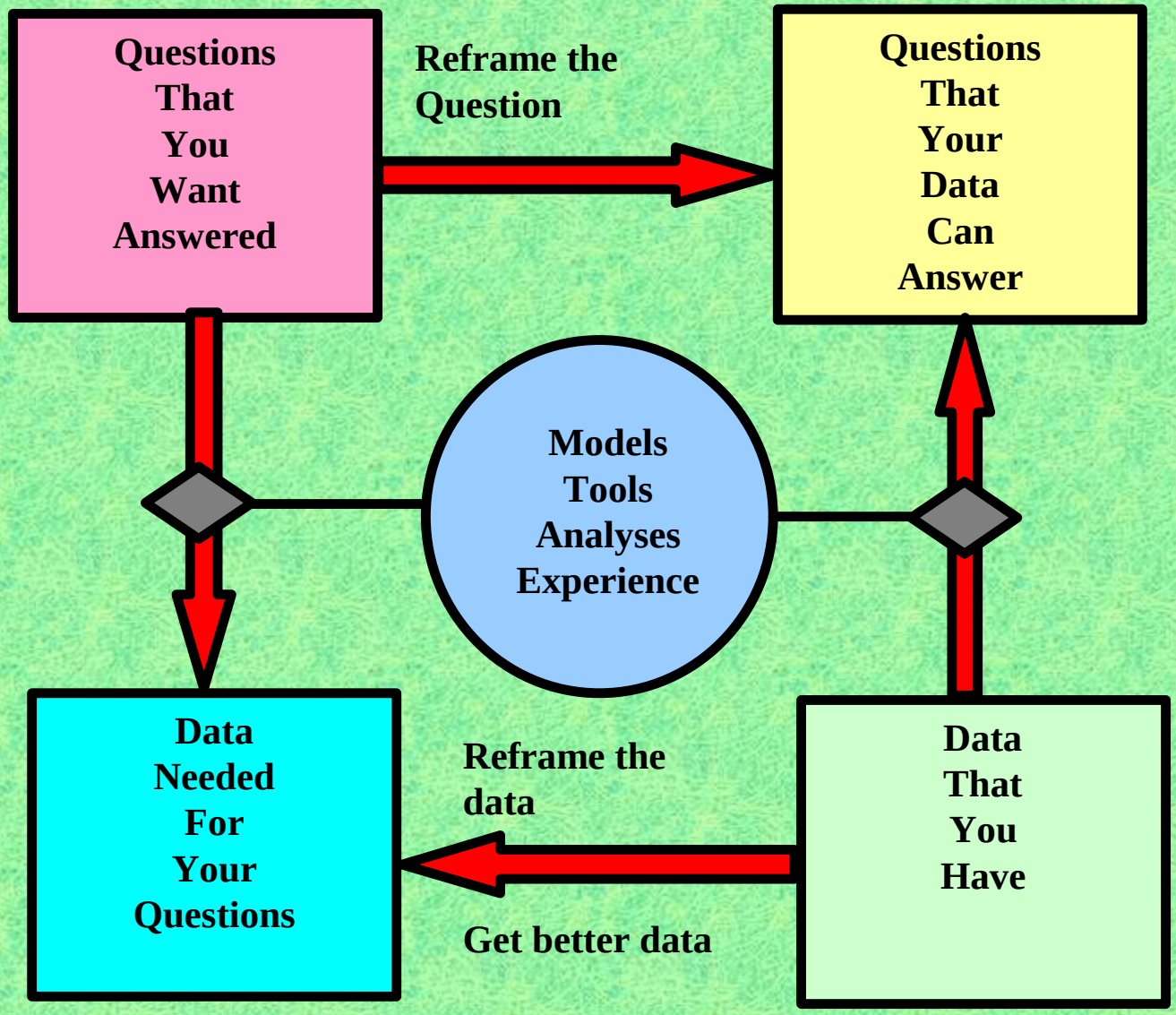
Southeastern Ecological Framework

Assessment Data and Tools

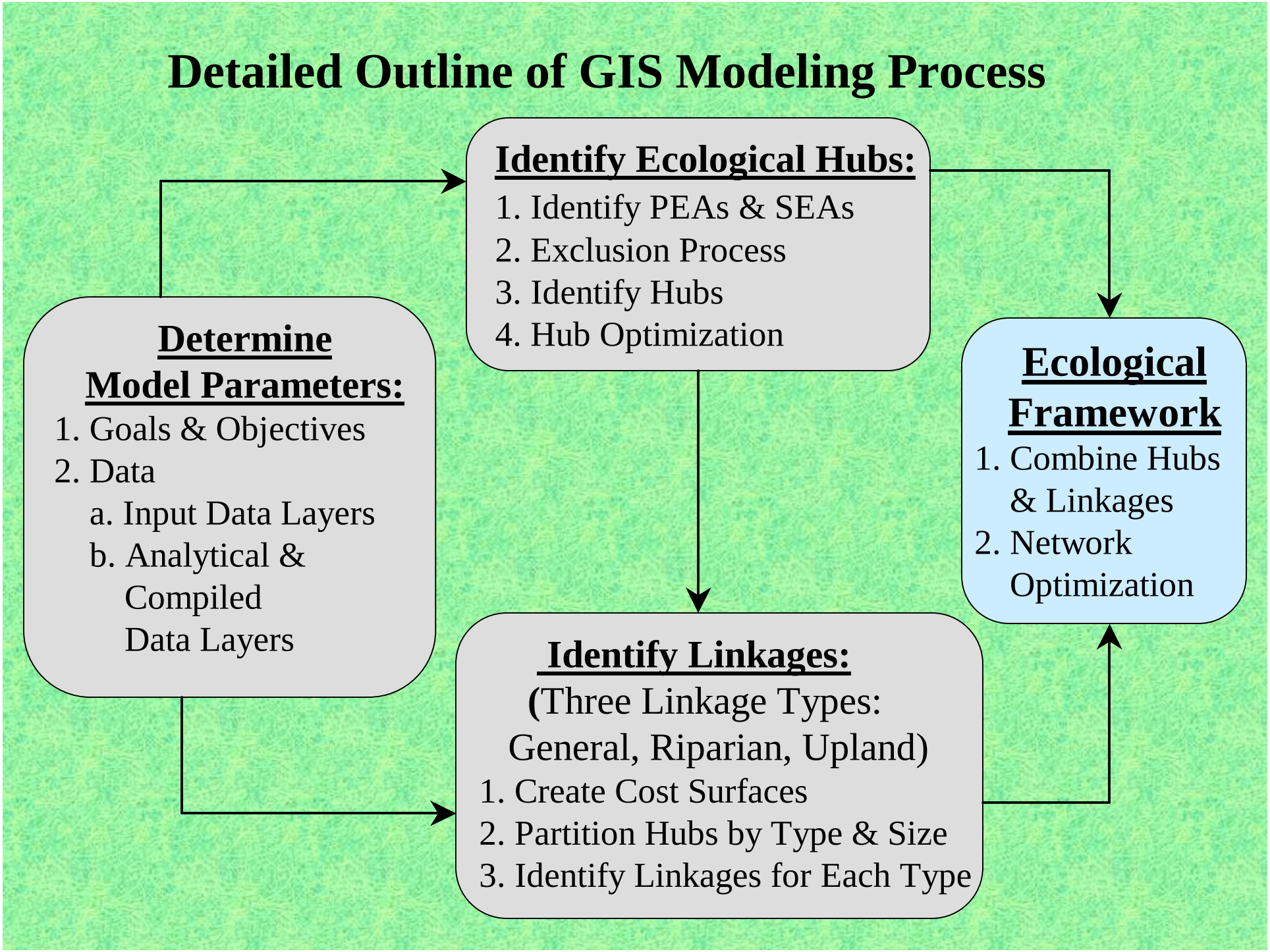


John Richardson
EPA Region 4
Planning and Analysis

How to solve that spatial question



Detailed Outline of GIS Modeling Process



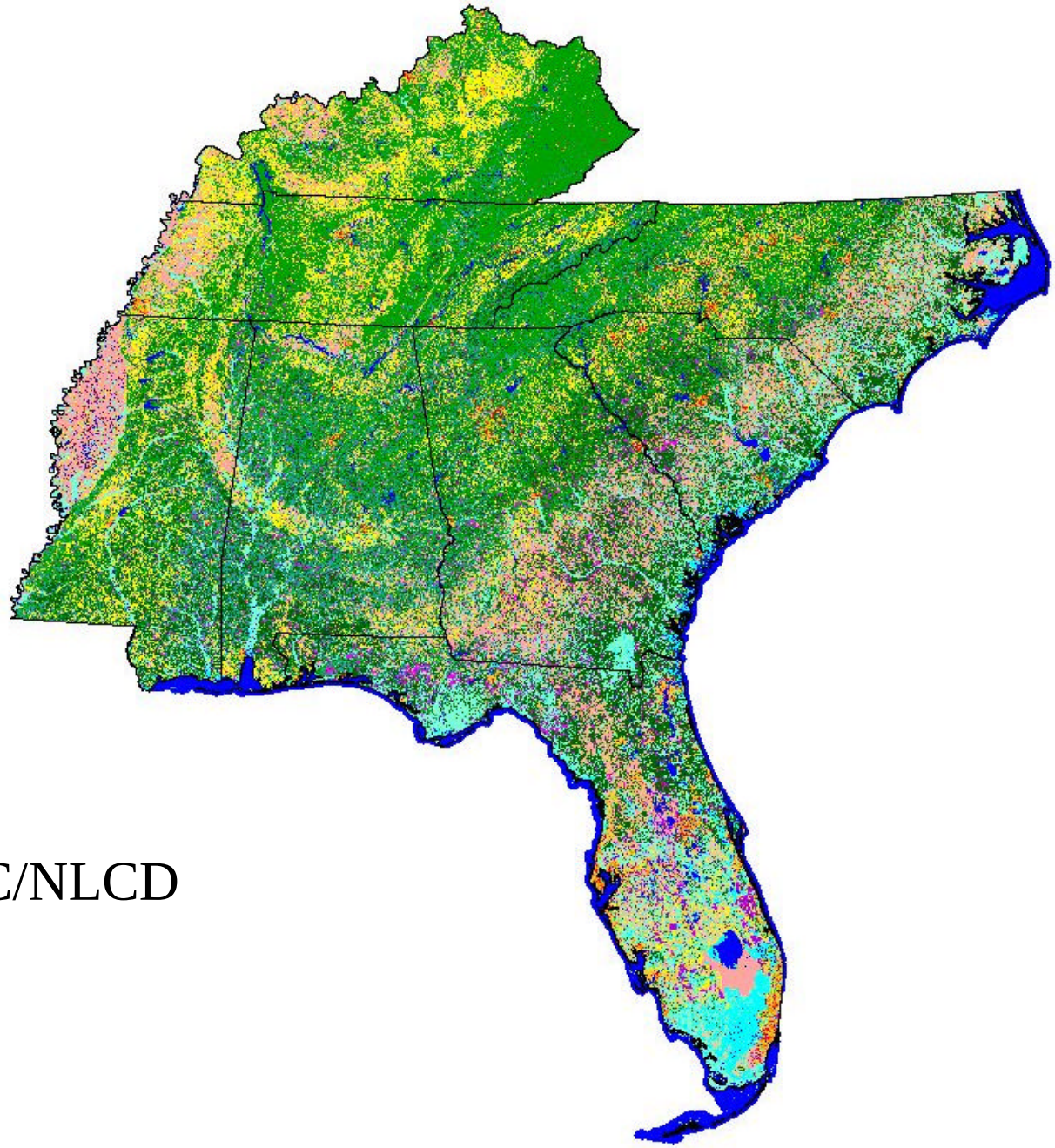
Input Data Layers:

Regional:

- MRLC* (TVA Land use data)
- LUDA (Land use/land cover data)
- FEMA
- USGS 1:100,000 Hydrology
- National Estuary Research Reserves
- Road Grid Regional (Tiger Roads 1:100,000)
- Ecoregions
- National Forest Boundaries
- Forest Inventory Assessment
- Shellfish Areas
- Conservation Lands
- RF3 (River Reach Files)
- City Limits

State Data:

- FL Aquatic Preserves
- FL Areas of Conservation Interest
- FL Potential Natural Areas
- FL Fish & Wildlife Conservation Commission Strategic Habitat Conservation Areas
- FL Fish & Wildlife Conservation Commission Species Hot Spots
- FL Water Management District Land Use
- Element Occurrence (Florida, Alabama, Georgia)
- NC Significant Natural Areas
- NC Land Trust Priority Areas
- NC Anadromous Fish Spawning Areas
- NC Coastal Reserves
- NC Fishery Nursery Areas



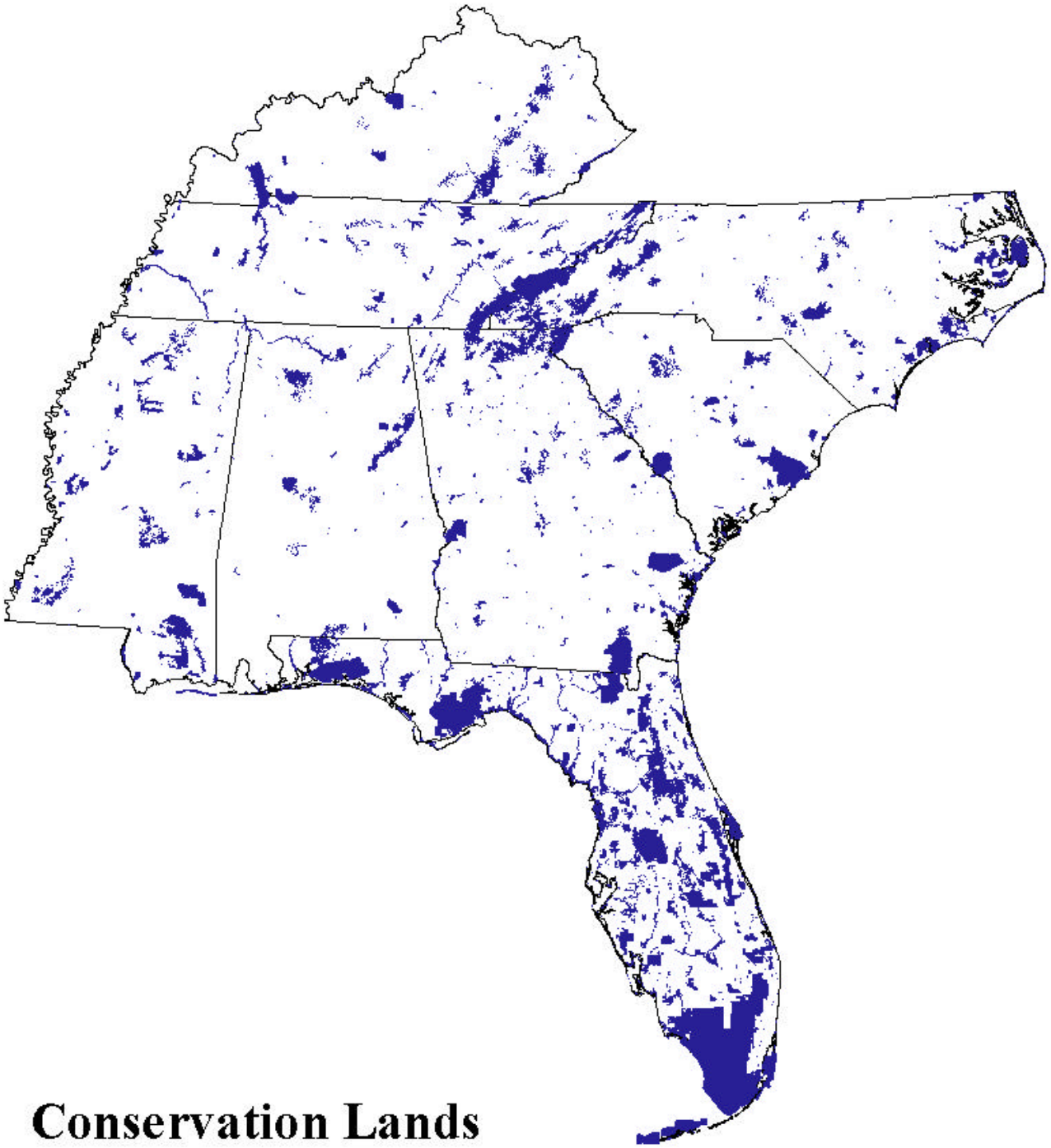
MRLC/NLCD

Analytical & Compiled Data Products:

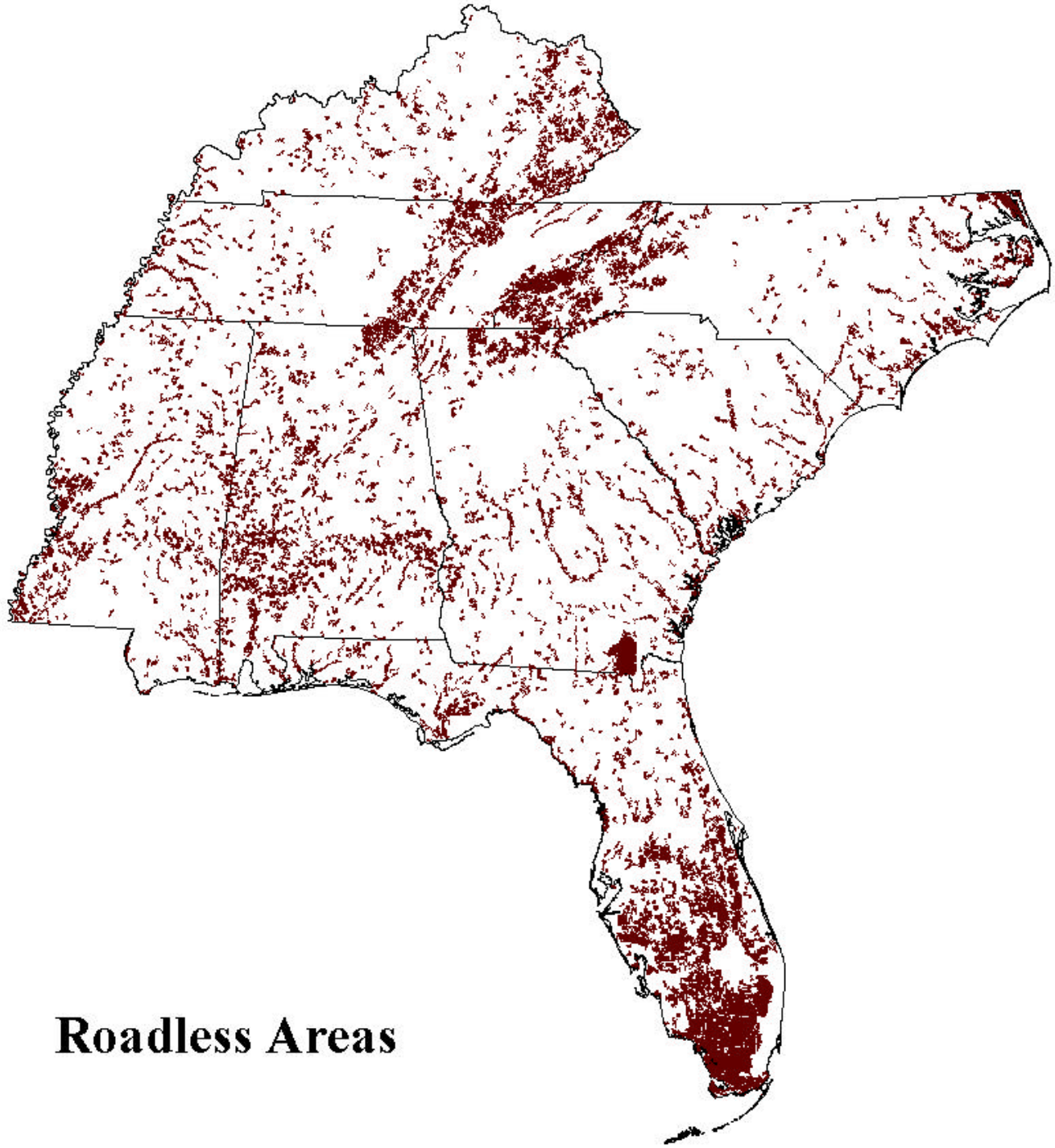
- Conservation Lands
- Wetlands
- Hydrographic Areas
- Major Rivers
- Wild and Scenic Rivers
- Stream Start Reaches
- Simplified Land Use Categories
- Hybrid Land Use
- Riparian Areas
- Habitat Diversity
- Natural Edge Habitat
- Black Bear Habitat
- Road Density
- Roadless Areas
- Negative Edge Effect

Priority Ecological Area Data Layers and Analyses

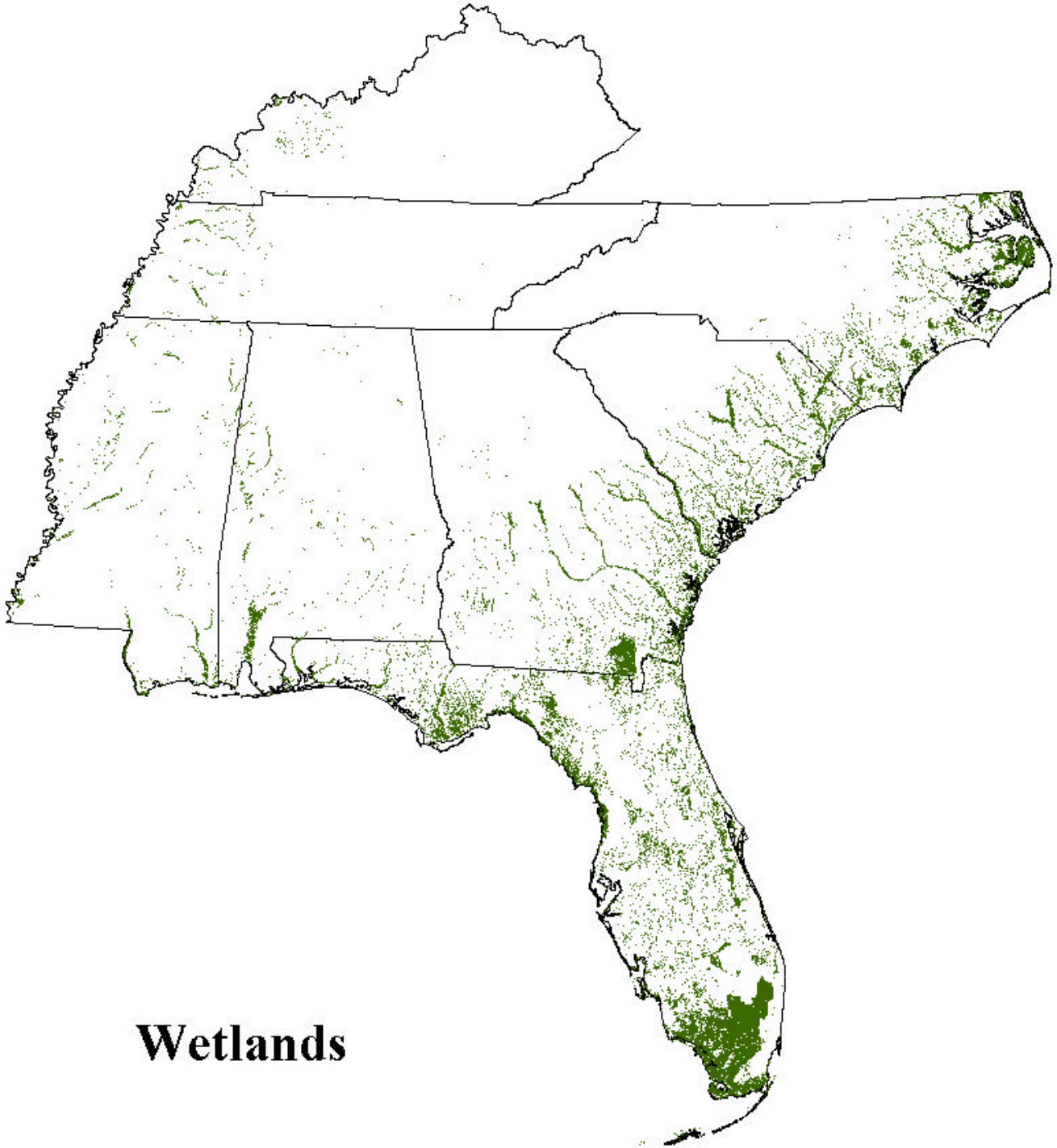
- Existing and proposed conservation lands
- Wetlands
- Natural Heritage Program Data and Species Analyses
    - rare/sensitive/listed species data (Florida, Georgia, Alabama)
    - significant natural areas (Florida and North Carolina)
- Priority water bodies and wetlands
    - shellfish harvest areas
    - wild and scenic rivers
    - aquatic preserves (Florida only)
    - fish nursery and spawning areas (North Carolina only)
- Potentially significant black bear habitat
- Roadless areas (5,000 acres or larger)
- Areas with high stream reach densities
- Biodiversity hotspots
- Critical species conservation areas
- Areas with significant natural edge habitat or habitat diversity
- Areas with significant longleaf pine stands or “old-growth” forest
- Coastal Barrier Resource Act Lands and National Estuarine Research Reserves

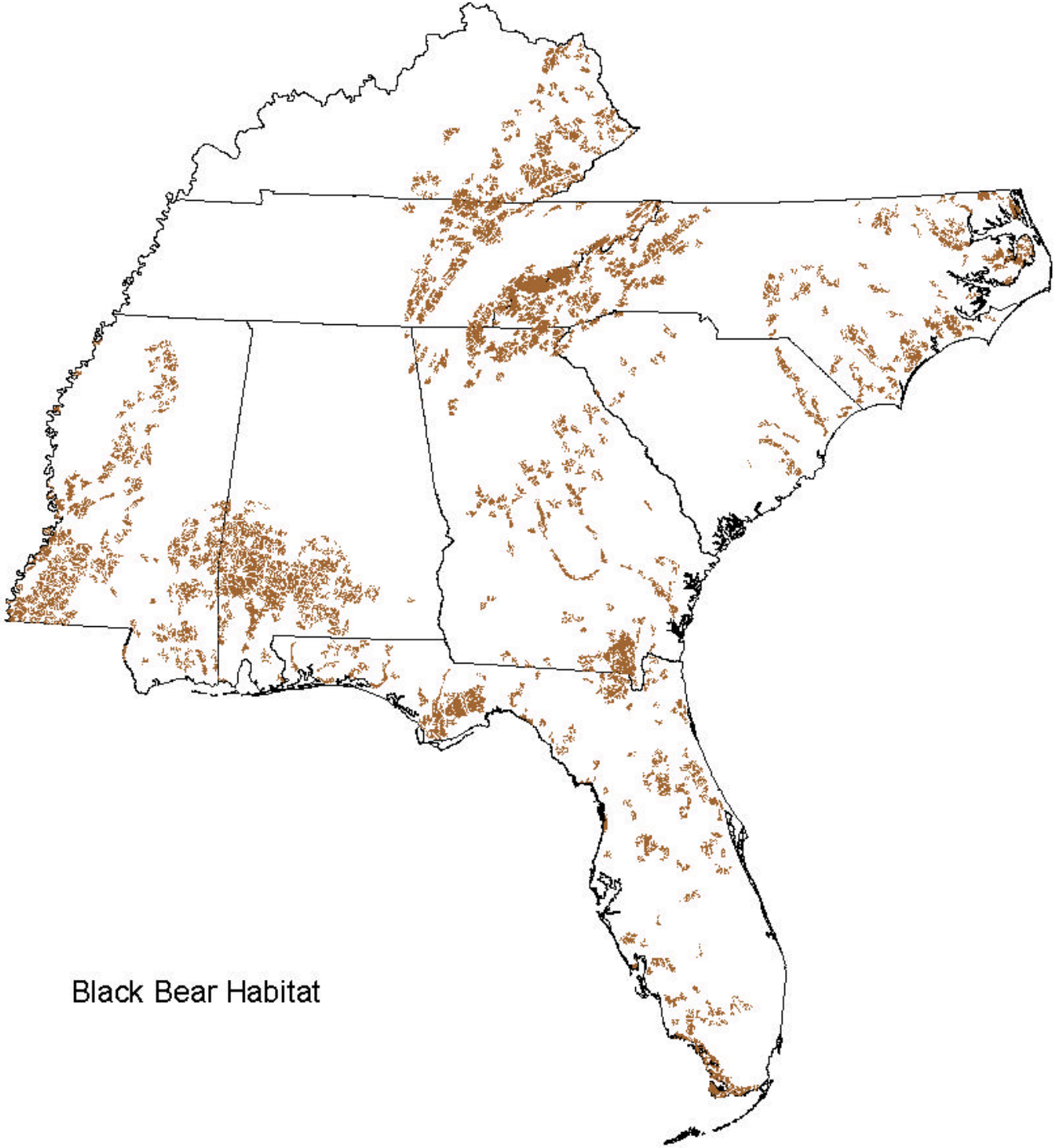


Conservation Lands

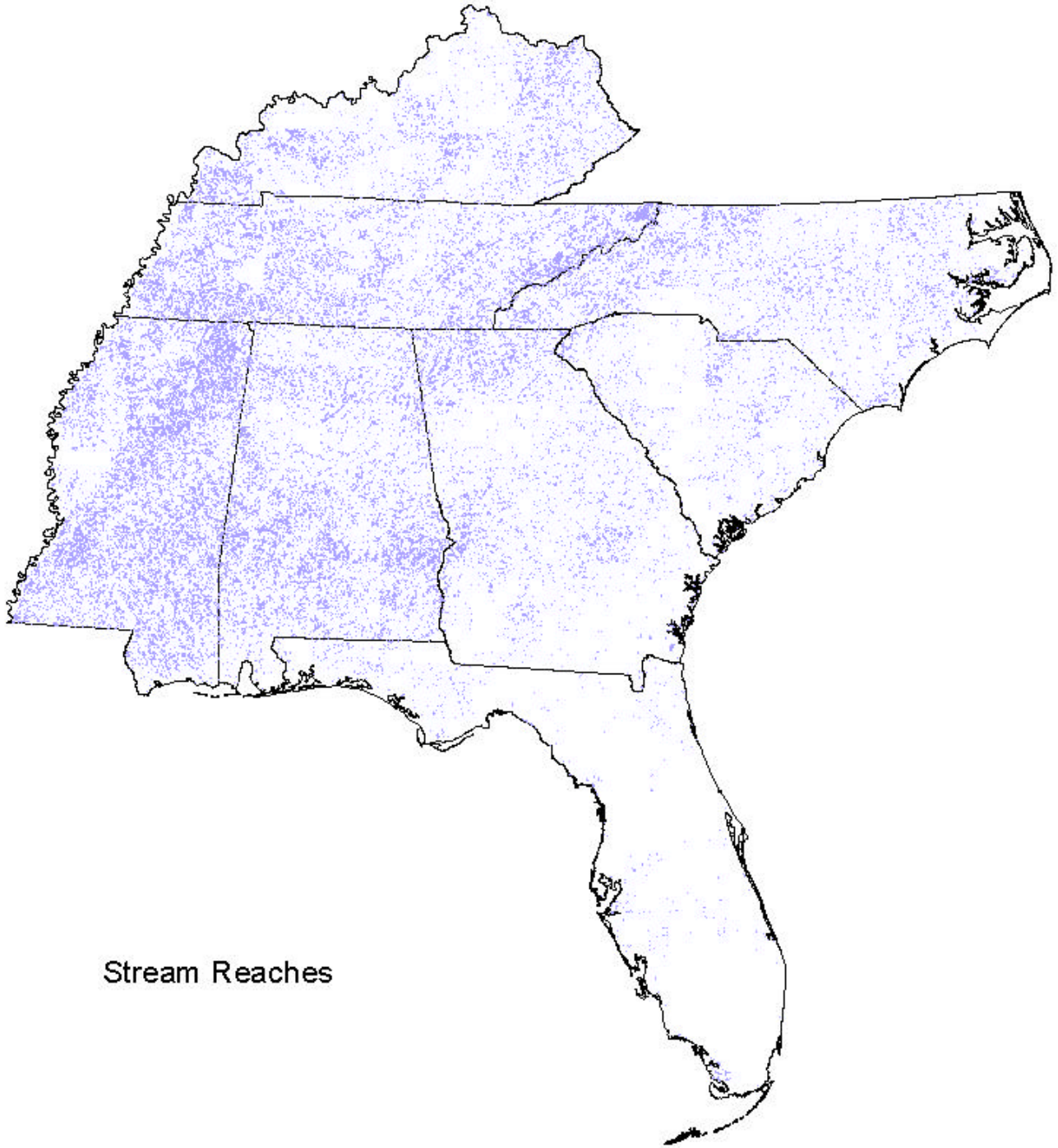


Roadless Areas

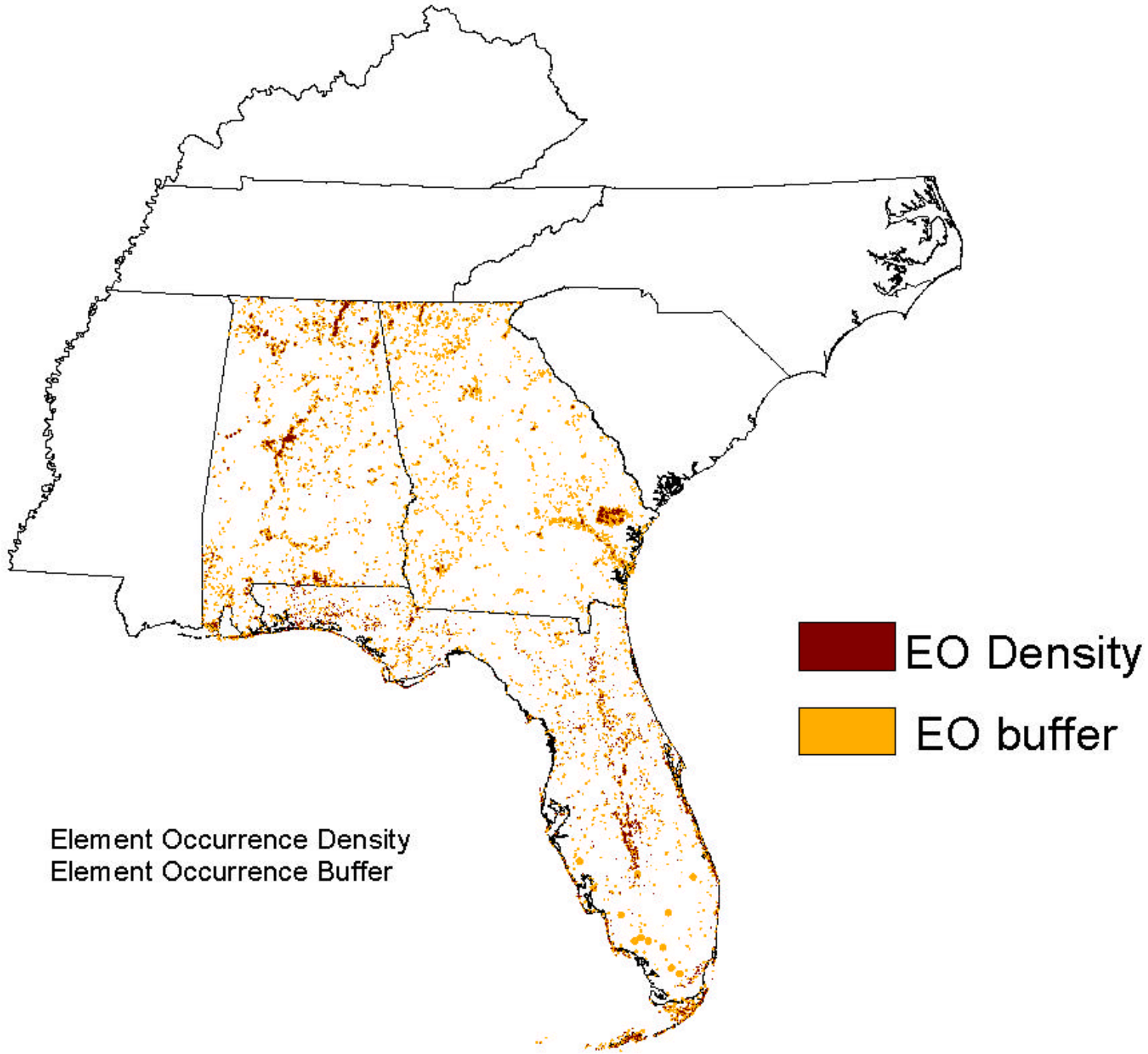

Wetlands

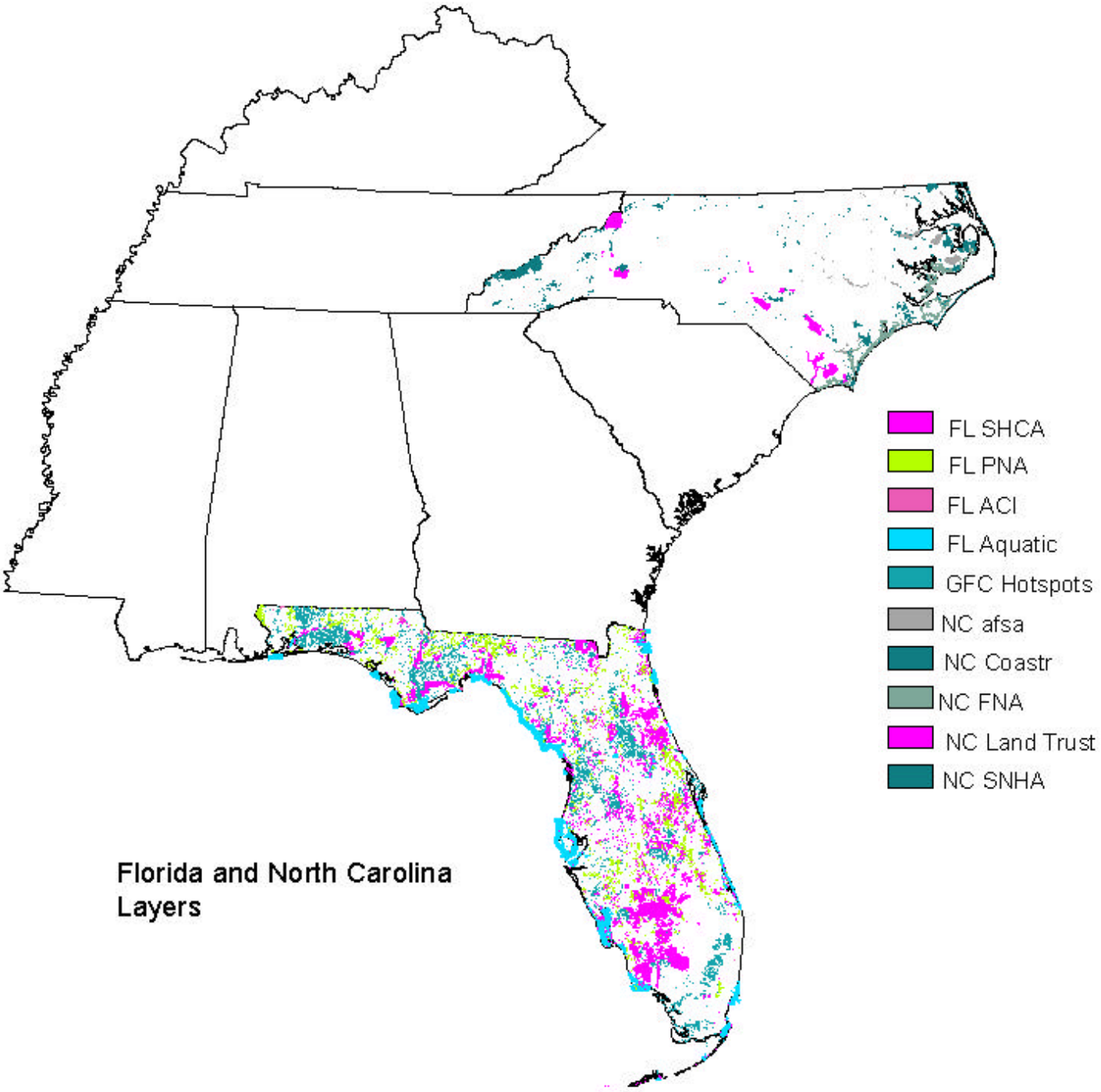


Black Bear Habitat

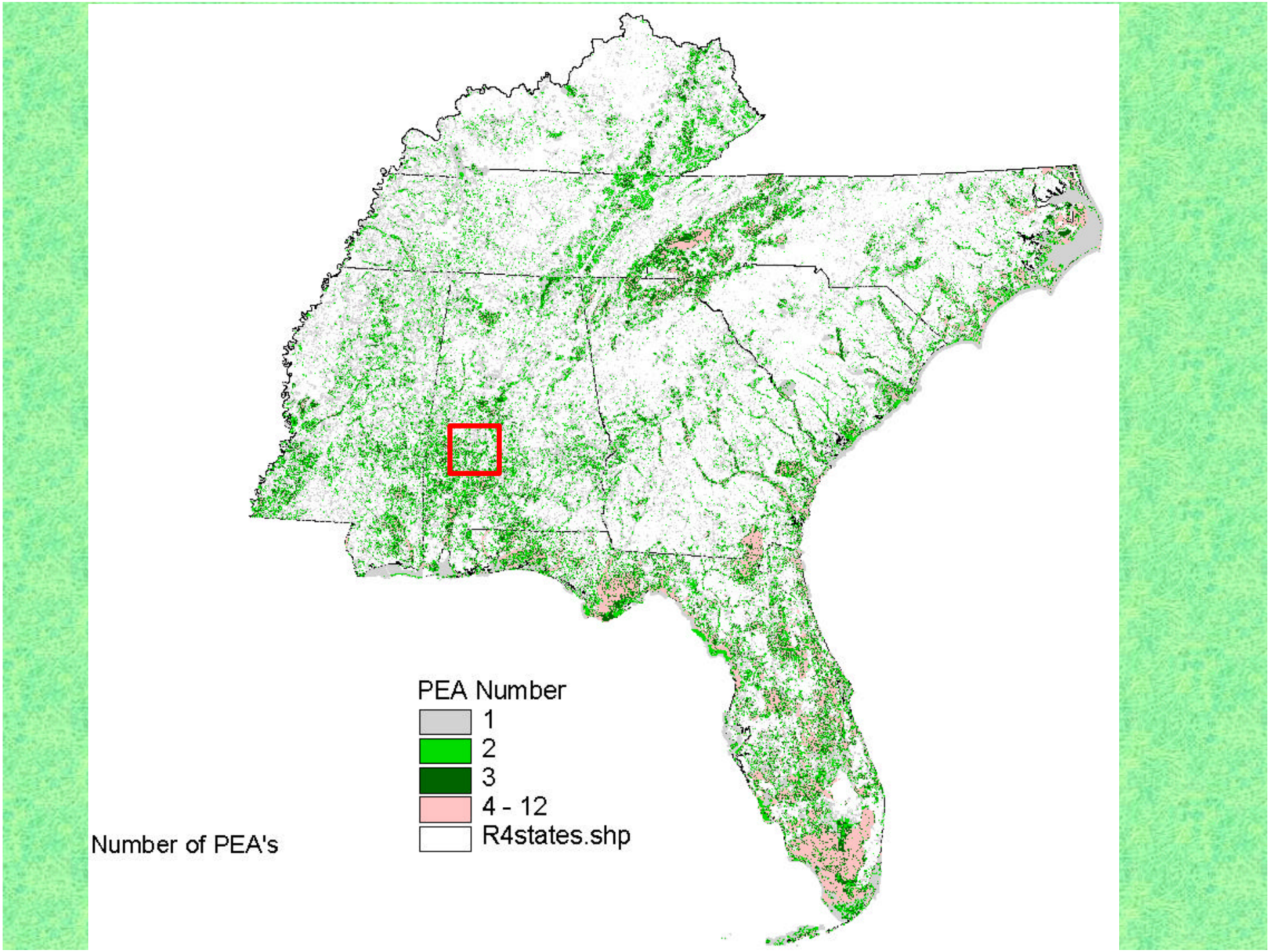


Stream Reaches

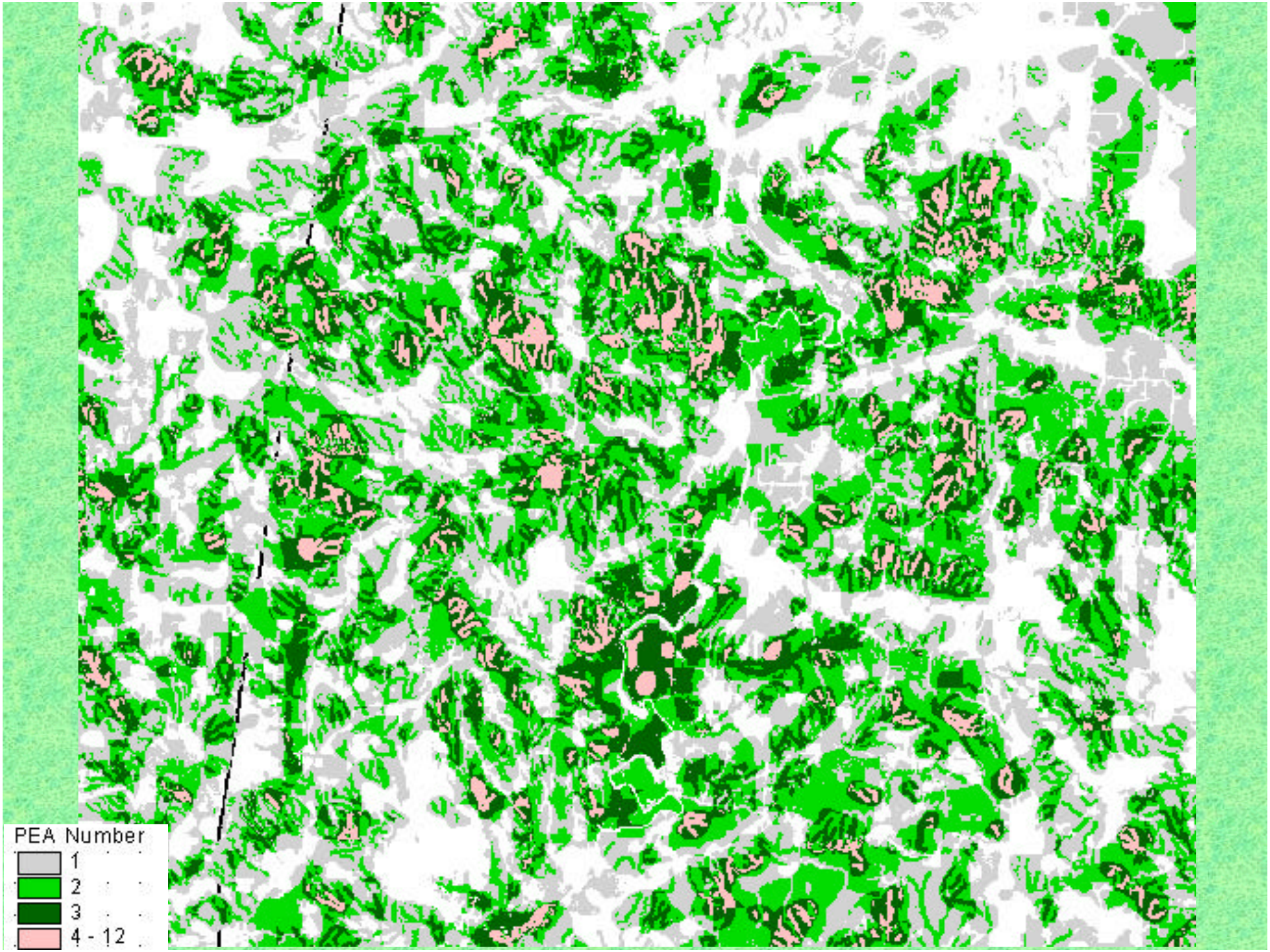

EO Density
EO buffer
Element Occurrence Density
Element Occurrence Buffer

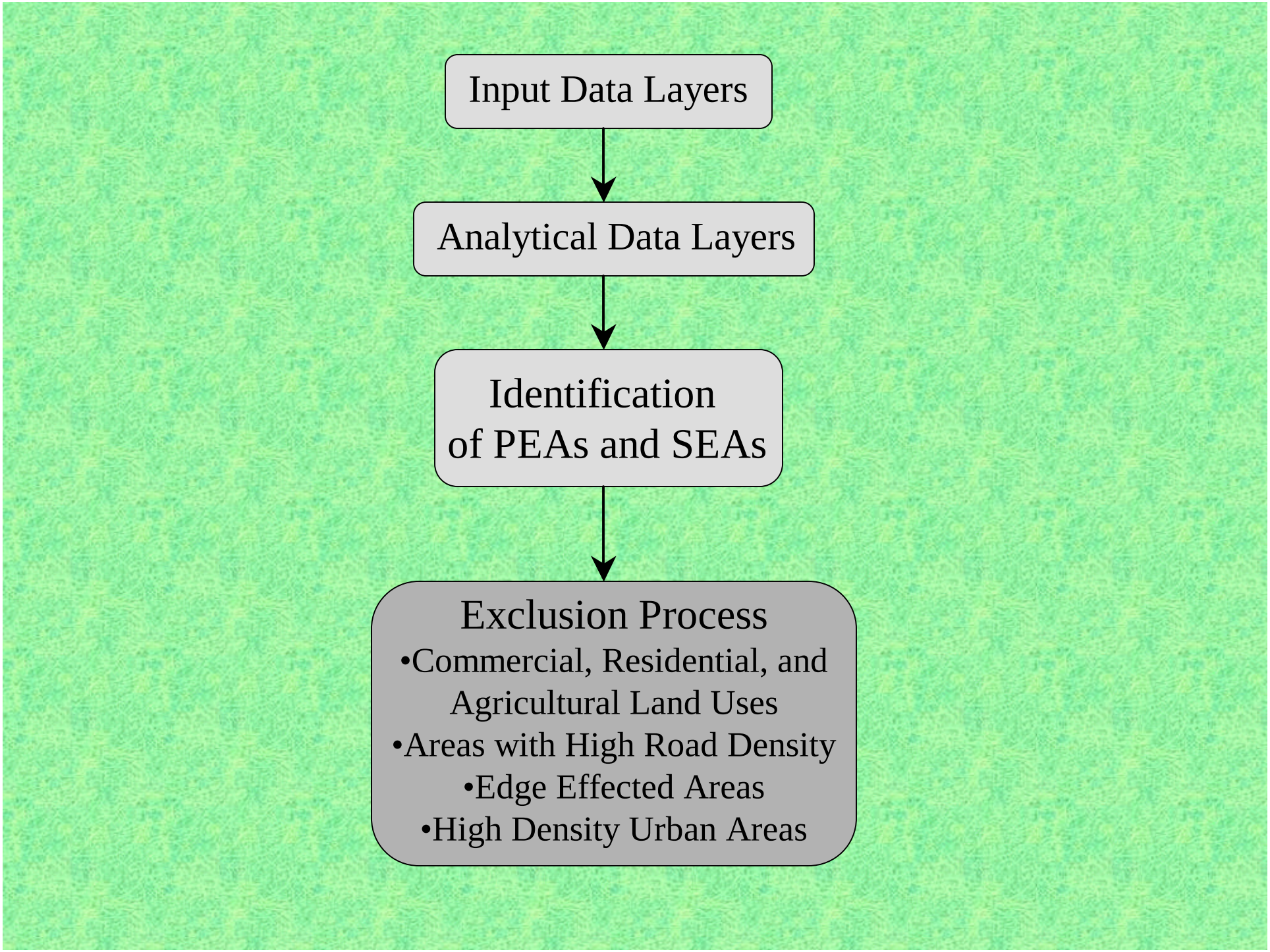


Florida and North Carolina Layers



Number of PEA's


PEA Number
1
2
3
4 - 12


Input Data Layers
Analytical Data Layers
Identification of PEAs and SEAs
Exclusion Process
•Commercial, Residential, and Agricultural Land Uses
•Areas with High Road Density
•Edge Effected Areas
•High Density Urban Areas

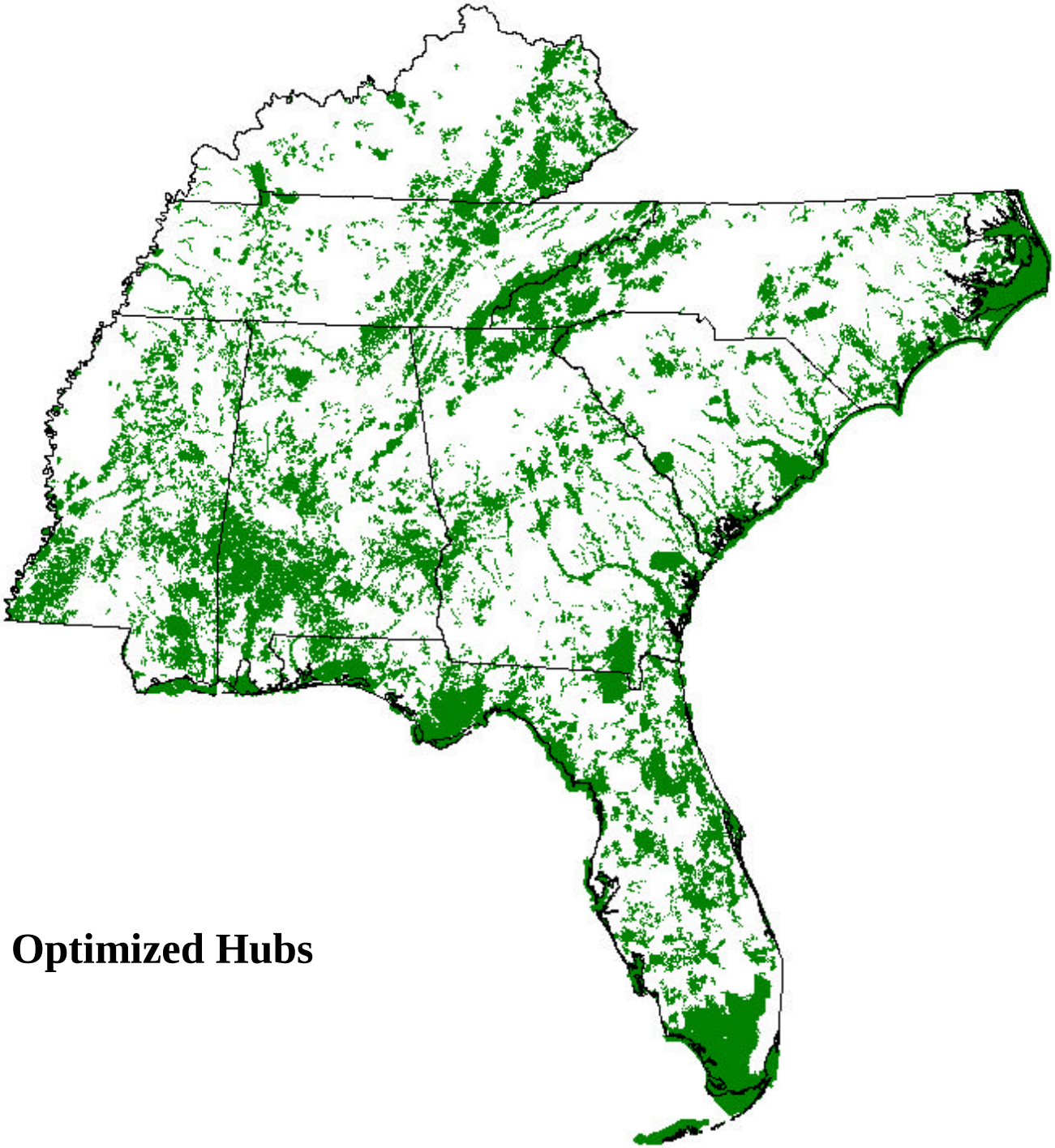
Identification of Hubs

After the exclusion process, identify any PEAs that are greater than 5000 acres.

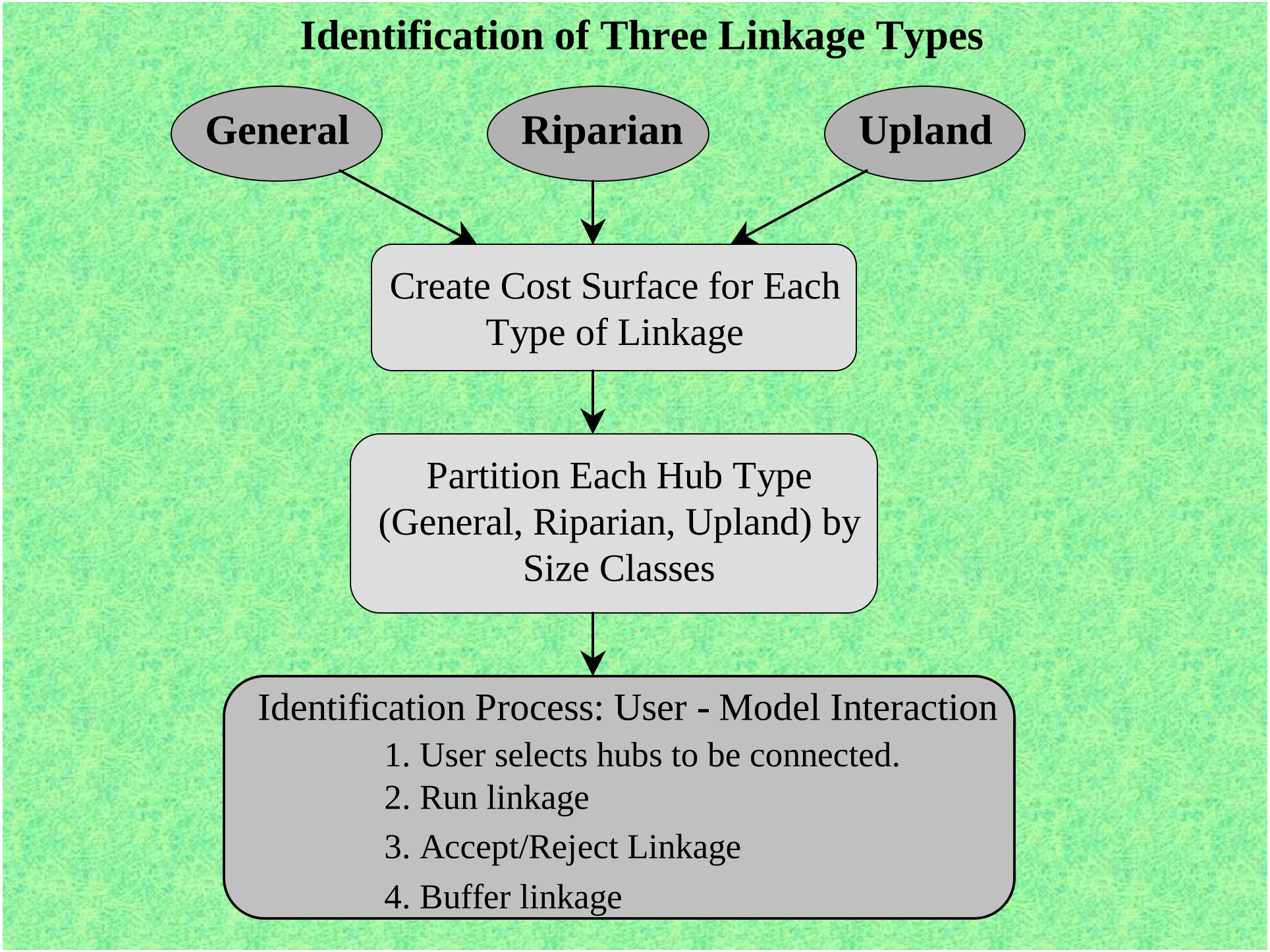
Issue: Hub size may vary by ecoregion

Hub Optimization:

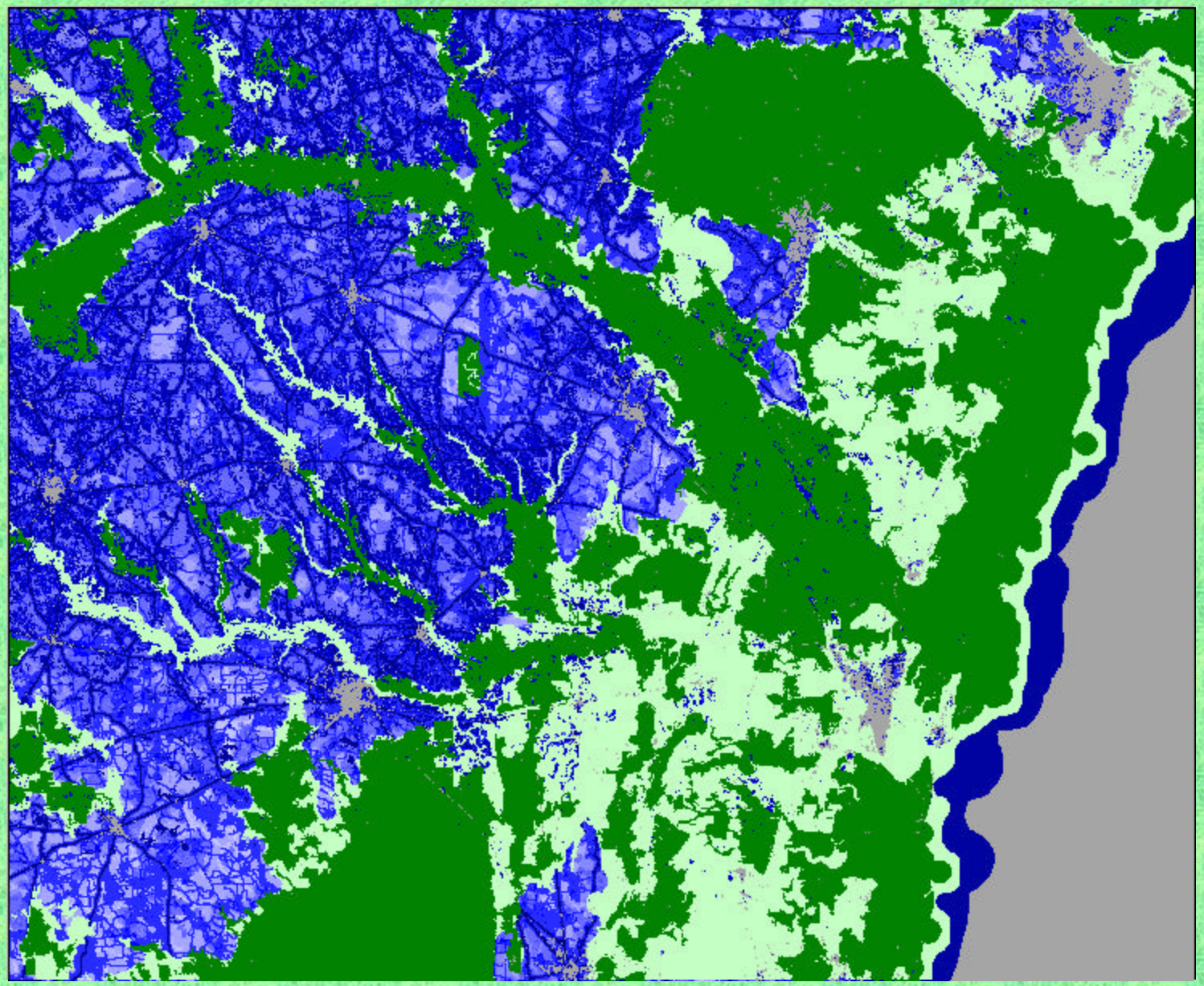
- Smooth outside edges.
- Fill in gaps with suitable land uses.
- Add in conservation lands without intensive land uses.



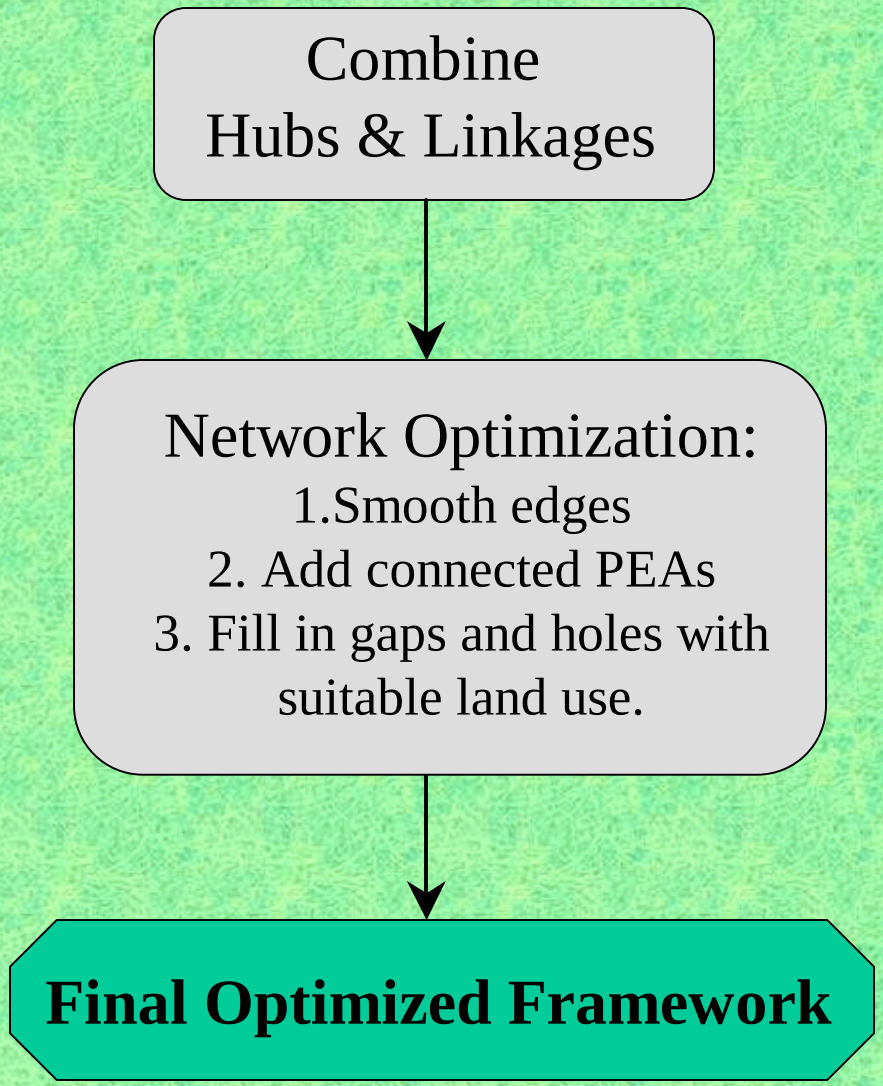
Optimized Hubs

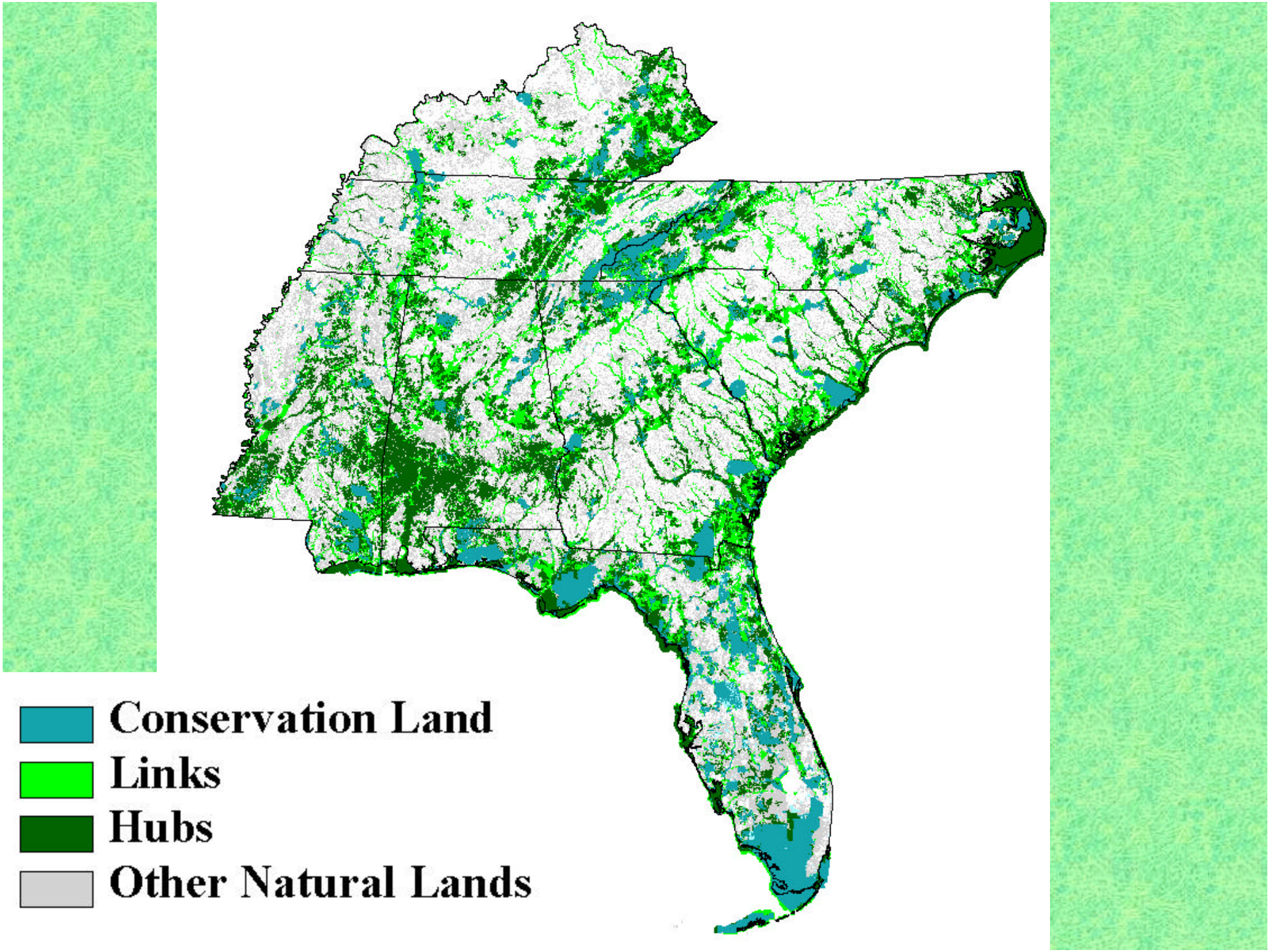

Identification of Three Linkage Types
General
Riparian
Upland
Create Cost Surface for Each Type of Linkage
Partition Each Hub Type (General, Riparian, Upland) by Size Classes
Identification Process: User - Model Interaction
1. User selects hubs to be connected.
2. Run linkage
3. Accept/Reject Linkage
4. Buffer linkage

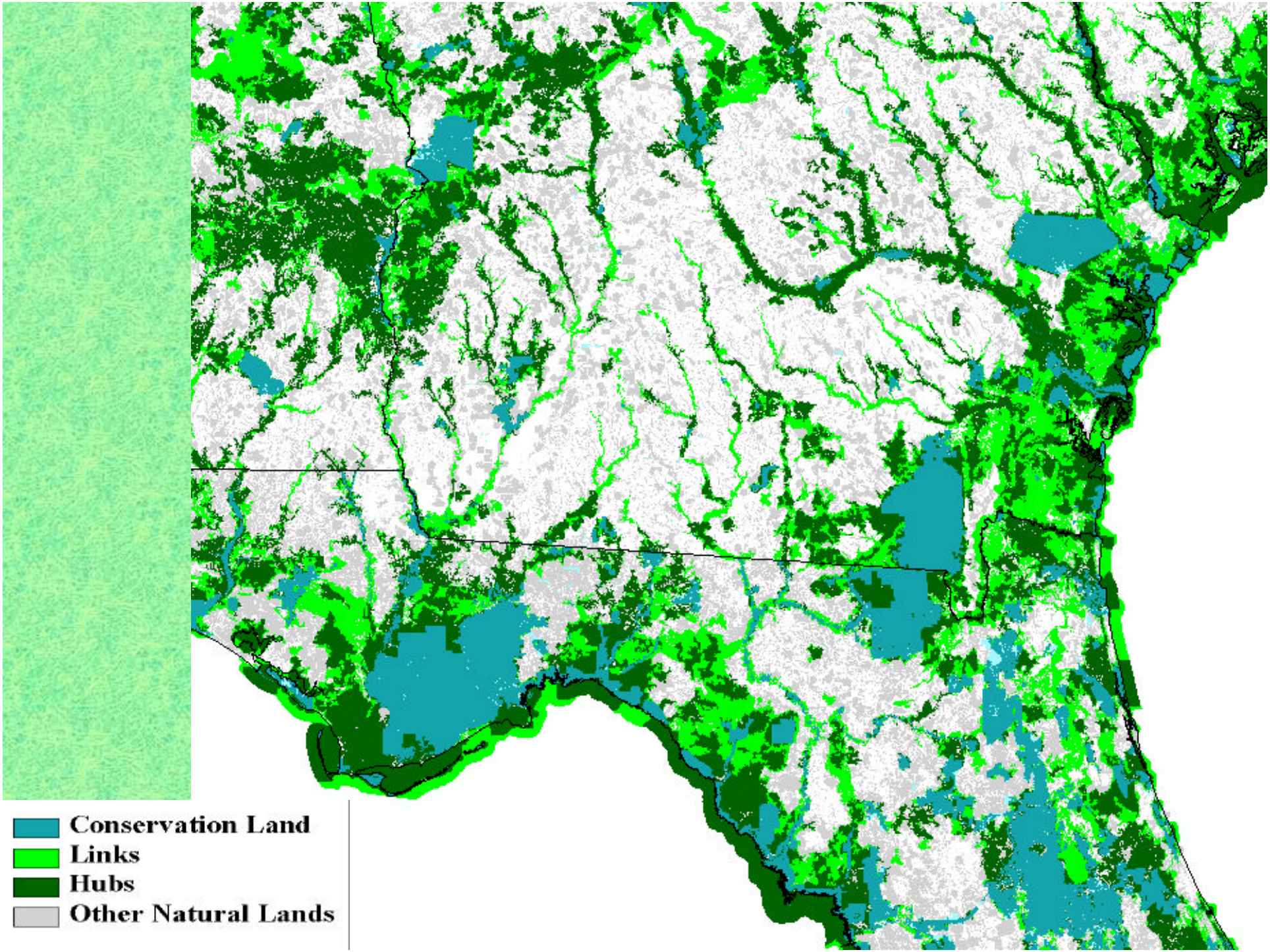
Coupling the Hydrologic Surface



Creation of the Ecological Framework




Conservation Land
Links
Hubs
Other Natural Lands


Conservation Land
Links
Hubs
Other Natural Lands

Data Issues / Needs:

Regional Consistency
- MRLC/NLCD
- NHD
- Ecological Processes
- Biodiversity measures not always consistent
- Ecoregion grouping

State / Local Data
- Variability between areas
- Legal / Proprietary Issues
- Cooperation and Buy-in

Tool Needs:

GIS analysis -- Spread function – find contiguous cells input that meet programmed criteria. Ex. Locate cells adjacent to stream network that are less than .5 m elevation greater than the Stream channel (1m, 2m, 5m).

Map viewer – enable non-GIS users to access the data (Geobook, Enviromapper, other web based viewers)

EPA Science Advisory Board Review Conclusions

A. The Panel recognizes and praises the significant efforts that have gone into the SEF. Such a framework is useful for integrating EPA programs in a region, as well as for providing a landscape context for decisions by states, local governments and private landowners in the region.

B. The Panel recommends that the SEF be enhanced to include a wider range of ecological attributes that are important to regional ecological integrity.

C. The Panel recommends that the process for setting criteria to select priority lands be made explicit and that the criteria and the individual data layers used in the SEF receive additional peer review.

D. With the caveats noted, the Panel agrees that application of the SEF approach would be beneficial in other regions of the U.S., although different data layers and/or different criteria for selecting priority areas likely would be needed.

Ecological Attribute types in SEF

Data only fits into 3 of the categories:
Biodiversity
Landscape
Hydrology/Geomorphology

Other Attributes needed:
Chemical/Physical
Ecological Processes
Natural Disturbance Regimes

Mapping issues with Ecological Attributes